Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-51. (canceled)

52. (new) A method of imaging a site within a subject comprising the steps of:

a) administering to the subject an effective amount of a composition comprising a radionuclide-labeled bis-aminoethanethiol (BAT)-targeting ligand conjugate; and

b) detecting a radioactive signal from the site by emission tomography.

53. (new) The method of claim 52, wherein the emission tomography is positron emission tomography (PET).

54. (new) The method of claim 52, wherein the emission tomography is single photon emission computed tomography (SPECT).

55. (new) The method of claim 52, wherein the targeting ligand is a tissue-specific ligand.

56. (new) The method of claim 52, wherein the subject is a mammal.

57. (new) The method of claim 52, wherein the subject is a human.

58. (new) The method of claim 52, wherein the site is in the breast, ovary, prostate, endometrium, lung, brain, or liver.

59. (new) The method of claim 52, wherein the site is an area of inflammation.

60. (new) The method of claim 59, wherein the area of inflammation is an infection.

61. (new) The method of claim 52, wherein the site is a tumor.

62. (new) The method of claim 61, wherein the tumor is breast cancer, lung cancer, prostate cancer, ovarian cancer, brain cancer, liver cancer, cervical cancer, colon cancer, renal cancer, skin cancer, head & neck cancer, bone cancer, esophageal cancer, bladder cancer, uterine cancer, lymphatic cancer, stomach cancer, pancreatic cancer, testicular cancer, lymphoma, multiple myeloma, folate-positive cancer, or estrogen-positive cancer.

63. (new) The method of claim 52, wherein the radioactive signal from the administered composition localizes at the site.

64. (new) The method of claim 52, wherein the radionuclide is ^{68}Ga, ^{62}Cu, or ^{64}Cu.

65. (new) The method of claim 52, wherein the radionuclide-labeled bis-aminoethanethiol (BAT)-targeting ligand conjugate is a radionuclide-labeled ethylenedicysteine-targeting ligand conjugate.

66. (new) The method of claim 52, wherein the targeting ligand is an anticancer agent, DNA topoisomerase inhibitor, antimetabolite, tumor marker, folate receptor targeting ligand, tumor apoptotic cell targeting ligand, tumor hypoxia targeting ligand, DNA intercalator, receptor marker, peptide, nucleotide, organ specific ligand, antibiotic, antifungal, antibody, glutamate pentapeptide, or an agent that mimics glucose.

67. (new) The method of claim 66, wherein the targeting ligand is an anticancer agent.

68. (new) The method of claim 67, wherein the anticancer agent is methotrexate, doxorubicin, tamoxifen, paclitaxel, topotecan, LHRH, mitomycin C, etoposide tomudex,

podophyllotoxin, mitoxantrone, camptothecin, colchicine, endostatin, fludarabin, gemcitabine, or tomudex.

69. (new) The method of claim 66, wherein the targeting ligand is a tumor marker.

70. (new) The method of claim 69, wherein the tumor marker is PSA, ER, PR, CA-125, CA-199, CEA AFP, interferons, BRCA1, HER-2/neu, cytoxan, p53, endostatin, or a monoclonal antibody.

71. (new) The method of claim 66, wherein the targeting ligand is a folate receptor targeting ligand.

72. (new) The method of claim 71, wherein the folate receptor targeting ligand is folate, methotrexate, or tomudex.

73. (new) The method of claim 66, wherein the targeting ligand is a tumor apoptotic cell targeting ligand or a tumor hypoxia targeting ligand.

74. (new) The method of claim 73, wherein the targeting ligand is annexin V, colchicine, nitroimidazole, mitomycin, or metronidazole.

75. (new) The method of claim 66, wherein the targeting ligand is glutamate pentapeptide.

76. (new) The method of claim 66, wherein the targeting ligand is an agent that mimics glucose.

77. (new) The method of claim 76, wherein the agent that mimics glucose is glucosamine, deoxyglucose, neomycin, kanamycin, gentamicin, paromycin, amikacin, tobramycin, netilmicin, ribostamycin, sisomicin, micromicin, lividomycin, dibekacin, isepamicin, astromicin, or an aminoglycoside.

78. (new) The method of claim 77, wherein the agent that mimics glucose is glucosamine or deoxyglucose.

79. (new) The method of claim 52, wherein the radionuclide-labeled bis-aminoethanethiol (BAT)-targeting ligand conjugate further comprises a linker conjugating the BAT to the targeting ligand.

80. (new) The method of claim 79, wherein the linker comprises a water soluble peptide, glutamic acid, aspartic acid, bromo ethylacetate, ethylene diamine, or lysine.

81. (new) The method of claim 79, wherein said linker is glutamate peptide or poly-glutamic acid.

82. (new) The method of claim 80, wherein the targeting ligand is estradiol, topotecan, paclitaxel, raloxifen, etoposide, doxorubricin, mitomycin C, endostatin, annexin V, LHRH, octreotide, VIP, methotrexate, or folic acid.